

This state of affairs I have found in certain Hornbills and in many Owls. At present I have not surveyed the principal groups of birds from this point of view; but some years since I described the same thing in a Penguin. Apart from this latter instance, which I hope to have the opportunity of re-examining, it is interesting to find a likeness between the Passeres and the Picarian birds, and between both and the Owls.

As to the homologies of this structure outside the Class Aves, I am inclined to liken it to what Mr. G. W. Butler has termed the "post-hepatic septum" in the Teiida. This structure, with which I am perfectly familiar from my own dissections, is a transverse septum which is attached to the ventral parietes, and nearly completely shuts off the liver-lobes from the rest of the abdominal cavity. In the Iguanida (*Iguana*, *Metopoceros*, *Phrynosoma*) there is apparently a trace of this post-hepatic septum in the shape of a membrane of limited extent which arises from the end of the right lobe of the liver, and is attached to the lateral parietes, forming thus a pocket shutting off the lung of that side of the body. In the Crocodile the membrane covering the liver, which represents a portion of the oblique septa, is reflected below the liver and separates it from the adjacent stomach; this is probably to be also looked upon as a representative of the structures mentioned.

5. A Note upon *Dissura episcopus*, with Remarks upon the Classification of the Hrodiones. By FRANK E. BEDDARD, M.A., F.R.S., Prosector to the Society, Examiner in Zoology and Comparative Anatomy to the University of London.

[Received January 13, 1896.]

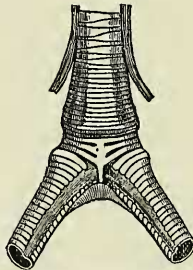
As is well known, one of the main points of difference between the Ciconiida and the Ardeida is that the former possess the ambiens muscle, while the latter do not. But the late Prof. Garrod pointed out to this Society¹ some years since that this general rule is not without exceptions; for in *Xenorhynchus senegalensis* and *Abdimia sphenorhyncha* he discovered that the muscle so typical of the Storks was absent. Another point of difference between the Storks and the Herons is in the structure of the syrinx; in the Storks this modified region of the windpipe curiously resembles the syrinx of the tracheophone Passeres, while the Herons have a perfectly typical tracheo-bronchial syrinx. I found myself some years ago² that *Xenorhynchus senegalensis*, and more especially *Abdimia sphenorhyncha*, offered some points of likeness to the Herons in the structure of their syringes, which appeared to me to have some significance when correlated with the muscular peculiarity already referred to. In *Abdimia* (cf. fig. 2, p. 233),

¹ "Note on an Anatomical Peculiarity in certain Storks," P. Z. S. 1877, p. 711.

² "On the Syrinx in certain Storks," P. Z. S. 1886, p. 321.

contrary to what we find in typical Storks (*cf.* fig. 3, p. 234), the membrana tympaniformis is well developed and the bronchidesmus is incomplete. This Stork, however, agrees with other Storks in the absence of intrinsic syringeal muscles and in the modification of a large number of the last tracheal rings. In looking through the MS. notes left by the late Prof. Garrod, with a view to a forthcoming work upon the Anatomy of Birds, upon which I am at present engaged, I find that the two Storks above mentioned are not the only ones in which the ambiens muscle is absent. A third species, viz. *Dissura episcopus*, is precisely in the same condition. This bird is often spoken of as *Ciconia episcopus*; but it seems to me that the anatomical peculiarity referred to justifies its generic

Fig. 1.

Syrinx of *Dissura episcopus*.

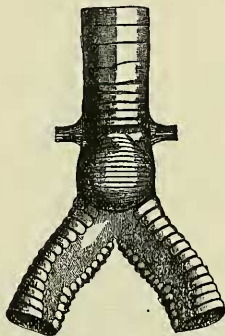
separation—just as Prof. Garrod thought of the species of *Xenorhynchus* which showed the same absence of so characteristic a Ciconiine muscle.

The discovery of this note reminded me that I had preserved at the time of its death the syrinx of a specimen of *Dissura episcopus*. On examining this syrinx, I found that it presented quite the same anomaly of structure (from the Ciconiine point of view) as does *Abdimia*. It is very interesting to find here also—correlated with the deficient ambiens—a syrinx that approaches the Ardeine in its characters. In *Dissura*, however, the bronchidesmus is complete as in the typical Storks; but the membrana tympaniformis, as may be seen from the drawing exhibited (see fig. 1), is well developed, quite as well as in *Abdimia* (see fig. 2, p. 233). I need not trouble the Society with a detailed description of the syrinx of the bird, since the accurate drawing shows all its features of interest. It may be generally pointed out that the terminal rings of the trachea are Stork-like as in *Abdimia*, and that there are no intrinsic muscles; but that the membrana tympaniformis is Ardeine, with a well-developed pessulus. This is, in my opinion, an additional reason for placing this species of Stork in a genus distinct from

Ciconia; and it may be possible to regard it as congeneric with *Abdimia*, remembering that both are African in range. In any case we have here a distinct relation between structure and geographical distribution.

The Storks and Herons are contrasted by other structures than those to which reference has already been made in the present communication. I desire now to call the attention of the Society to certain structures which have not hitherto been used in this connection, and which indeed have been but little made use of in the systematic arrangement of birds. These characters are drawn

Fig. 2.

Syrinx of *Abdimia sphenorhyncha*.

from the number and position of the muscles of the lungs, those muscles which usually arise from the ribs and expand over the pulmonary aponeurosis. To the complete set of these muscles the term "diaphragm" has been applied. But at the present moment I am not concerned with their general morphology, but with their use in detailed classification.

It has been stated by Prof. Weldon¹ that in the Storks "the pulmonary aponeurosis is not muscular." So far as my experience enables me to say, that statement is nearly but not absolutely true.

In a specimen of *Ciconia alba* I found a single muscle on each side of the body arising from the most anterior of the ribs bordering upon the lung, and lying just in front of the anterior intermediate air-sae. The rest of the pulmonary aponeurosis was perfectly free from muscles. On the other hand, the Herons are well provided

¹ "On some Points in the Anatomy of *Phenicopterus*," P. Z. S. 1883, p. 640.

with special lung-muscles, as can be seen in dissections of *Nycticorax* and *Cancroma*. In the former bird there are four pairs of muscles arising from the rib, each individual muscle, of course, from a single rib. But in addition to these, two muscles arise on each side from the bronchus just where it enters the lung-substance and fan out over the aponeurosis; they both spring from the posterior surface of the bronchus and diverge slightly from each other to their insertion.

Fig. 3.

Diagram of the syrinx of *Leptoptilus* (see p. 232).

The origin of these muscles from the bronchus is interesting in view of a very similar relationship of lung-muscles to bronchi which I described some years ago in the Condor¹; but in the latter bird the muscles are attached at the distal end to the parietes and not to the lung-surface, though, as in *Nycticorax*, they arise from the bronchi.

In *Cancroma* five pairs of ribs border the area occupied by the lungs. From the last four of these arise slender slips of muscle which passing forward end upon the pulmonary aponeurosis. The bronchi in this Heron have not the broncho-pulmonary muscles of *Nycticorax*. It seems, therefore, that we have here a character which serves to distinguish the Ardeidæ from the Ciconiidæ.

The Syrinx of the Ardeidæ.—Though the syringes of such of the Ardeidæ as I have been able to examine differ but little among themselves, it may be useful to give a short account of what I have ascertained, since but little, so far as I am aware, has been published on the matter.

¹ "Notes on the Anatomy of the Condor," P. Z. S. 1890, p. 146, woodcut fig. 3.

Nycticorax griseus may serve as a typical Heron upon which to hang the description of such slight divergences from the normal as exist. Reckoning as the last tracheal ring that from which the pessulus arises in front, the intrinsic muscles, which are narrow and do not fan out much, are attached to the third bronchial semiring; on the posterior aspect of the syrinx the last tracheal ring is incomplete, the pessulus being attached to the one in front. The widest bronchial semirings (seen laterally) are the third and fourth; they are also the last ossified ones. I can detect no difference in *Ardea cinerea*, *A. cocoi*, *A. agami*, *A. candidissima*, *Nycticorax violaceus*, and *Tigrisoma brasiliense*. In *Ardea ludoviciana* each muscle is much fanned out and almost divided into two muscles, of which one is inserted near to hinder border of rings.

6. Additional Note on the Sea-Otter.

By R. LYDEKKER, F.R.S.

[Received January 10, 1896.]

In reference to my note on the Sea-Otter (*Latax lutris*), published in the Society's Proceedings for 1895 (p. 421), I have received another communication from my correspondent Mr. H. J. Snow, of Yokohama. He therein tells me that I have misunderstood the



Sea-Otter in walking posture.

meaning of his statement that "the hind flippers are doubled back." In interpreting this as meaning that they were bent